REMARKS

Claims 1 through 12 are pending in the application.

Applicants acknowledge with gratitude the Examiner's continued indication that the claimed invention is patentable in light of the art of record.

Claims 1 and 12 have been amended to delete the term "may have any substitution." Support for this amendment can be found in the Application-as-filed.

Reexamination and reconsideration of this application, withdrawal of all rejections, and formal notification of the allowability of the pending claims are earnestly solicited in light of the remarks which follow.

Rejection Under 35 USC § 112

Claims 1 through 12 stand rejected as failing to comply with the written description requirement for the recitation "any substitution." Without addressing the merits of the rejection, and solely to advance prosecution of the above-referenced case, Claims 1 and 12 have been amended to delete the term "may have any substitution."

Claims 1 through 12 stand further rejected as failing to comply with the written description requirement for the recitations "akyl, alkenyl, alkynl and cycloalkyl." Applicants respectfully submit that independent Claims 1 and 12 more specifically recite "C_1 - C_8-alkyl radical, C_3 - C_{10}-cycloalkyl, alkenyl or alkynyl."

Applicants respectfully reiterate that the Application-as-filed conveys with reasonable clarity to one skilled in the art that Applicants were clearly in possession of the claimed processes as of the filing date sought, and thus the claimed invention fully complies with the written description requirement.

It may be useful to briefly consider the invention before addressing the merits of the rejection.

Nitriles and isonitriles are significant and versatile known intermediates in organic synthesis. Conventional techniques to-date used to form nitriles from carboxamides and isonitriles from formamides involve their dehydration using reagents such as $POCl_3$ or dicyclohexylcarbodiimde as noted in the Application-as-filed on Page 1, lines 6 through 14 and Page 2, lines 9 through 11. Unfortunately, the drastic conditions required in conventional nitrile and isonitrile formation can epimerize stereocenters and/or the by-products formed can be difficult to remove, as discussed in the Application-as-filed on Page 2, lines 1 through 17.

Altogether unexpectedly, Applicants have found that cyclic phosphonic anhydride is a highly selective reagent that may be used at relatively moderate temperatures for converting carboxamides by dehydration to the corresponding nitriles and formamides by dehydration to the corresponding isonitriles, without inducing significant epimerization.[1]

Accordingly, in contrast to the urgings of the Office Action on Page 7, second paragraph and Page 3, first paragraph, Applicants respectfully submit that the "nature of the invention," and hence the "critical and essential feature" of invention, is the claimed elimination of water from either carboxamides or formamides via the recited reaction with cyclic phosphonic anhydides at the recited moderate temperature range, and not merely the preparation of aryl or heteroaryl

[1] Solely for ease of discussion, as used herein, the term "carboxamide" is intended to include carboxamides, ammonium salts of carboxylic acids and carboxylic acids in the presence of ammonia or ammonium salts. The term "formamide" is similarly intended to include formamide and mixtures of amines with formic acid.

nitriles or isonitriles. Applicants additionally respectfully submit that the foregoing "essential or critical feature" is more than adequately described in the specification, and the raw materials used to form the claimed nitriles and isonitriles (which appear to be the basis of the rejection) are well known to one of ordinary skill in the art. In that regard, Applicants respectfully make of record that the contested "-R" groups are not functional groups that actively participate in the inventive reaction. The impetus of the invention is instead the dehydration of carboxamides or formamides with cyclic phosphonic anhydride.

Furthermore, in contrast to the urgings of the Office Action on Page 7, second paragraph, Applicants respectfully submit that the art of nitrile and isonitrile formation is well developed, as evidenced by Applicants discussion of several conventional techniques used to-date to form nitriles and isonitriles. As noted above, specific conventional techniques to-date used to form nitriles and isonitriles involve their dehydration using reagents such as $POCl_3$ or dicyclohexylcarbodiimde as noted in the Application-as-filed on Page 1, lines 6 through 14 and Page 2, lines 9 through 11.

The outstanding Office Action urges that the Specification does not demonstrate any support for R being anything "other than phenyl, methylphenyl and methyl 3-phenylpropanoate," and provides no examples or reduction to practice for nitriles or isonitriles in which R is a C_1 - C_8-alkyl radical, C_3 - C_{10}-cycloalkyl, alkenyl or alkynyl. (Office Action, Page 6, last partial sentence through Page 7, first sentence and Page 2, final paragraph, last sentence) Applicants respectfully submit that support for the recited C_1 - C_8-alkyl , C_3 - C_{10}-cycloalkyl, alkenyl, or alkynyl moiety can be found in the Application-as-filed, for example on Page 3, lines 1 through 2. Applicants further respectfully submit that constructive reduction to practice is sufficient under United States practice. When provided, testing may be used to demonstrate "the soundness of the principles of operation of the invention." *Wolter v. Belicka*, 161 USPQ 335, 341 (CCPA 1969). Applicants respectfully submit that the tested subject matter, in which the R moiety on the carboxamide or formamide is a "phenyl, methylphenyl and methyl 3-phenylpropanoate," is representative of the claimed subject matter and provides a basis for a

reasonable conclusion that all claimed subject matter, i.e. the R moiety on the carboxamide or formamide is a C_1 - C_8-alkyl, C_3 - C_{10}-cycloalkyl, alkenyl or alkynyl, will behave similarly.

Applicants further respectfully submit that one skilled in the chemical arts would actually consider the recited R moieties of C_1 - C_8-alkyl, C_3 - C_{10}-cycloalkyl, alkenyl or alkynyl to suffer from less stearic hindrance than the tested species, and thus the recited C_1 - C_8-alkyl, C_3 - C_{10}-cycloalkyl, alkenyl or alkynyl would be expected to more readily dehydrate to form the resulting nitriles and isonitriles. Applicants further respectfully submit that the results obtained by species other than those specifically tested would not provide unpredictable results, as urged within the outstanding Office Action on Page 7, first full paragraph, first sentence. In contrast to complex biological inventions inherently exhibiting an extraordinary amount of unpredictability (such as the cited *Eli Lilly* case), the claimed chemical invention has a significantly higher predictability. *Eli Lilly and Co.*, 119 F.3d 1159 (patent relating to recombinant DNA technology). Applicants respectfully submit that the scope of written description required varies inversely with the degree of unpredictability involved, analogous to the enablement requirement, and that the extraordinarily heightened written description standard applied to the biological arts (such as the cited *Eli Lilly* case) may not be imputed to the chemical arts.

Applicants thus respectfully submit that the claimed invention satisfies the written description requirement, based upon its actual reduction to practice of a representative number of species alone.

In contrast to the urgings of the Office Action on Page 7, first partial paragraph, fifth sentence, the Application-as-filed further clearly provides sufficient guidance concerning how to make the claimed nitriles or isonitriles containing the full scope of "·R" groups, particularly the recited C_1 - C_8-alkyl, C_3-C_{10}-cycloalkyl, alkenyl or alkynyl. The Application-as-filed more specifically teaches that nitriles or isonitriles containing the recited chemical moieties C_1 - C_8-alkyl radical, C_3 - C_{10}-cycloalkyl, alkenyl, or alkynyl are formed by charging a carboxyamide or formamide containing chemical moieties such as C_1 - C_8-alkyl radical, a C_3 - C_{10}-cycloalkyl,

alkenyl, alkynyl in a solvent, heating the same to the reaction temperature, and subsequently metering in the phosphonic ahydride as a melt or liquid mixture dissolved in solvent, as described in the Application-as-filed on Page 4, lines 14 through 19 in combination with Page 2, line 33 through Page 3, line 2. The Application-as-filed goes on to provide a list of suitable solvents on Page 3, line 29 through Page 4, line 9. The Application-as-filed further notes a range of suitable reaction temperatures (from – 30 to 120 C) and reaction times (from 1 to 12 hours) on Page 3, lines 19 through 24. Additionally, the Application-as-filed on Page 4, lines 10 through 12 discloses that the phosphonic anhydride is added in an at least stoichiometric amount in relation to the carboxamide or formamide. Thus the Application-as-filed provides more than sufficient guidance to one skilled in the art to make the claimed nitriles or isonitriles containing the recited C_1-C_8-alkyl radical, a C_3-C_{10}-cycloalkyl, alkenyl or alkynyl.

Applicants further respectfully submit that the formation of the starting carboxamides and formamides containing the recited C_1 - C_8 alkyl, C_3 - C_{10}-cycloalkyl, alkenyl or alkynyl, i.e. the formation of the reactants used in the subsequent inventive dehydration reaction, is well known to those skilled in the art. Applicants further respectfully submit that it is not necessary for the specification to teach anything that is already well-known in the field of the invention.

Applicants additionally respectfully submit that the recited terms "C_1 – C_8 alkyl, alkenyl, alkynl and C_3 – C_{10} cycloalkyl" are incredibly well known terms in the art whose art-recognized definitions have not been shown to be inconsistent, in contrast to the opinion urged in the outstanding Office Action at Page 5, final paragraph. Alkyls are well known in the art to be univalent radicals comprising carbon and hydrogen atoms that have no double or triple bonds, arranged in a chain. Alkenyls are well known in the art as unsaturated chemical compounds containing at least one carbon-to-carbon double bond. Alkynls are well known in the art to be hydrocarbons that have at least one triple bond between two carbon atoms. Cycloalkyls are well known in the art as univalent groups derived from hydrocarbons arranged in rings that have no double or triple bonds. Applicants further respectfully submit that it is not

necessary to further define $C_1 - C_8$ alkyl, alkenyl, alkynl and $C_3 - C_{10}$ cycloalkyl, as, again, it is not necessary to teach anything that is already well-known in the field of the invention.

In addition to satisfying the written description requirement by actual reduction-to-practice, Applicants also respectfully submit that the Application-as-filed discloses sufficient relevant, identifying characteristics of the claimed compounds coupled with a known correlation between function and structure sufficient to clearly show that Applicants' were in possession of each of the claimed alternative species. Specifically, the relevant, identifying characteristics are the presence of a carboxamide or formamide group on a reactant molecule and the function of the cyclic phosphonic anhydride is to dehydrate the carboxamide or formamide to produce a respective nitrile or isonitrile structure. Thus the Application-as-filed satisfies the written description requirement even in the absence of any working example. Stated differently, even in the absence of any working examples, the Application-as-filed clearly conveys to one of ordinary skill in the art that the inventor had possession of the claimed subject matter at the time the Application was filed.

Applicants further respectfully submit that the Application-as-filed is not required to meet any "art recognized experimental standard," as urged within the outstanding Office Action on Page 7, first partial paragraph, second full sentence. All that is required is that the patent document contain a full, clear and concise written description of the invention, as it is not a question of whether one skilled in the art might be able to construct the patentee's device from the teachings of the disclosure. Rather, it is merely a question of whether the application discloses the particular invention. *Martin v Mayer*, 823 F 2d 500, 505 (Fed. Cir. 1987).

Accordingly, Applicants respectfully submit that the claims as-amended fully comply with the written description requirement based on a number of grounds, and thus request withdrawal of the foregoing rejection.

CONCLUSION

It is respectfully submitted that Applicants have made a significant and important contribution to the art, which is neither disclosed nor suggested in the art. It is believed that all of pending Claims 1 through 12 are now in condition for immediate allowance. It is requested that the Examiner telephone the undersigned if any questions remain to expedite examination of this application.

It is not believed that extensions of time or fees are required, beyond those which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time and/or fees are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required is hereby authorized to be charged to Deposit Account No. 50-2193.

Respectfully submitted,

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